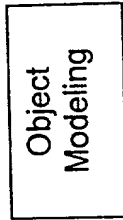


110

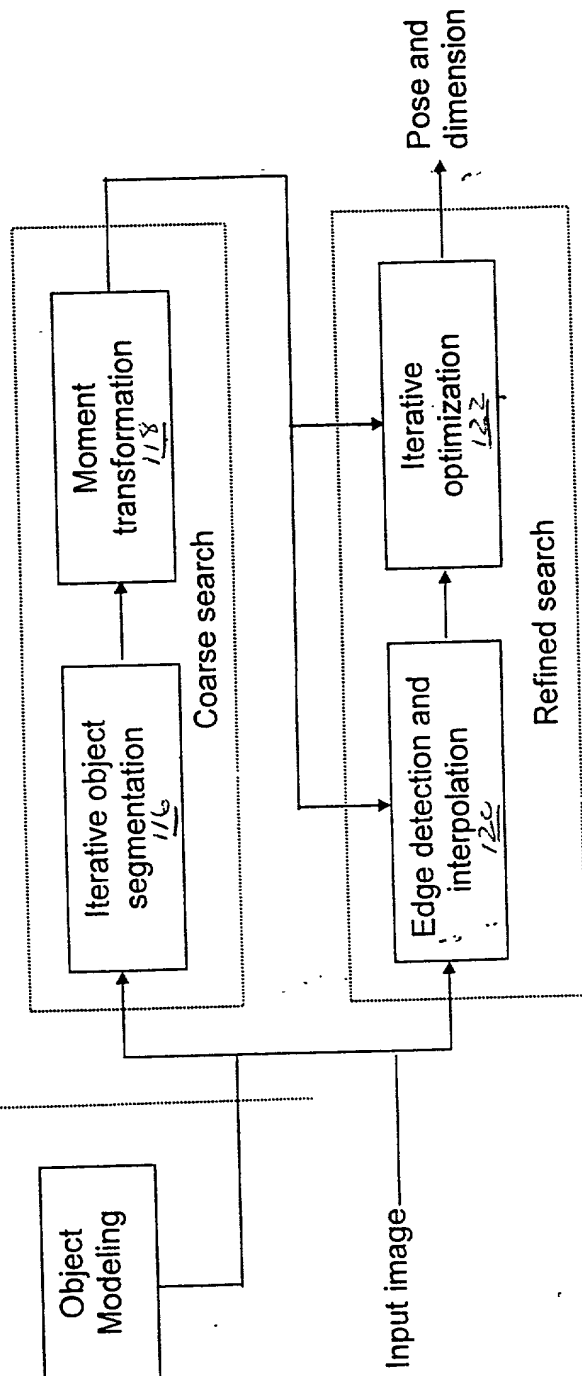
112

Offline process



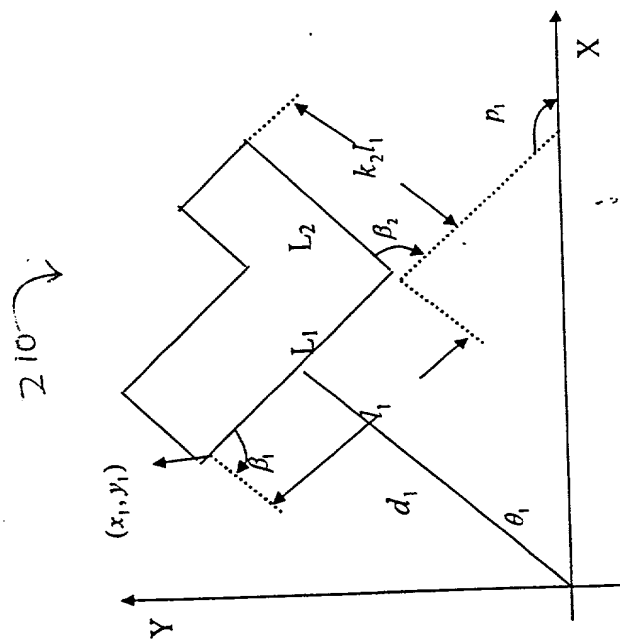
114

Runtime Process



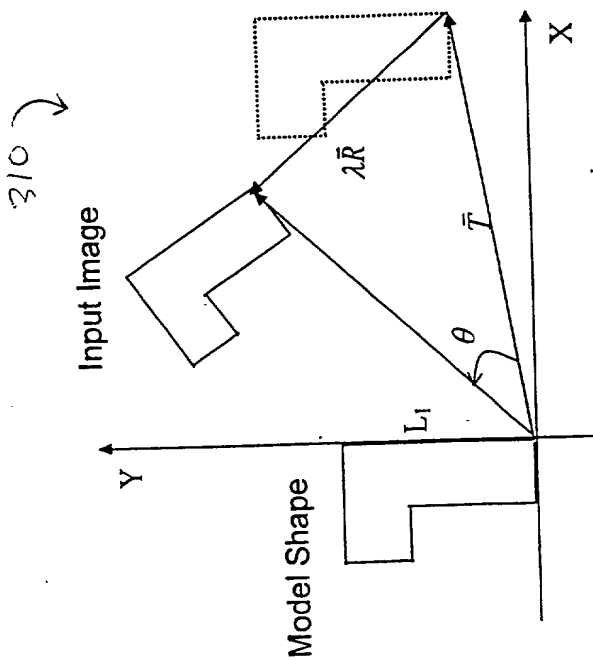
The model-based algorithm for localization and measurement of miniature SMC objects.

Fig. 1



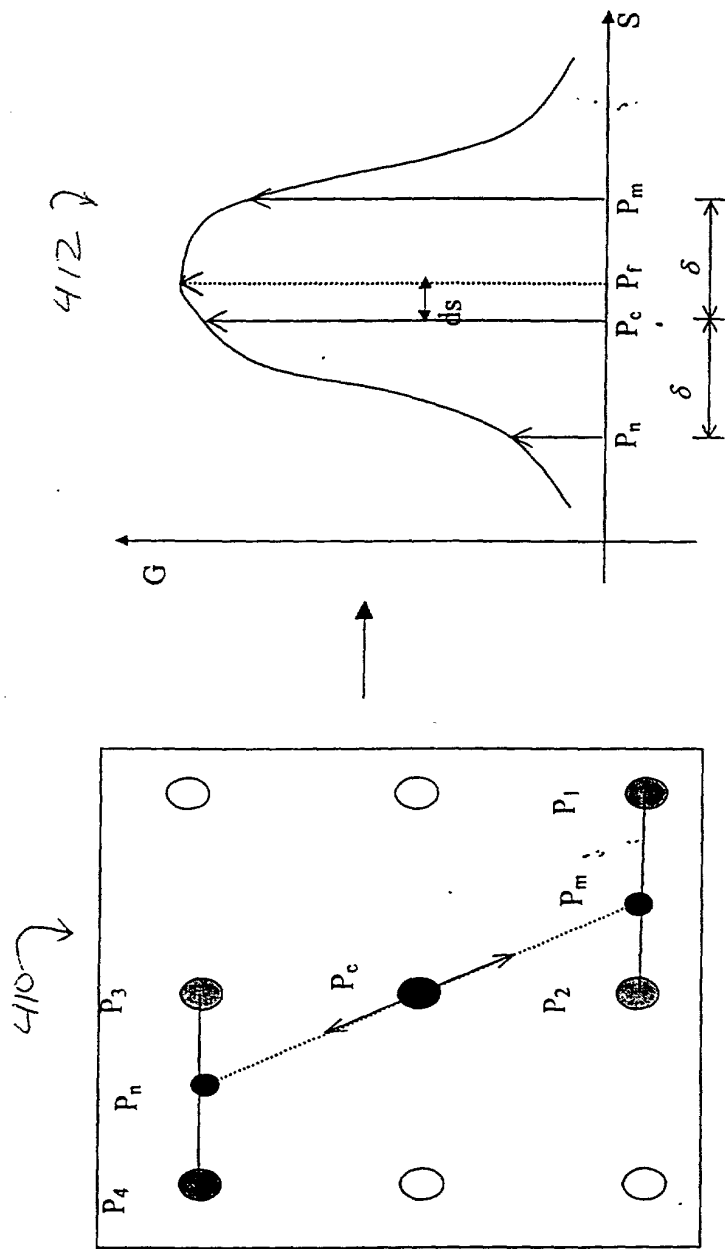
A polygon defined by the variables
 $(l_1, x_1, y_1, \theta_1, k_1, \beta_1)$

Fig. 2



A linear transformation between the model shape
 and the input image can be parameterized by
 translation, rotation, and scaling.

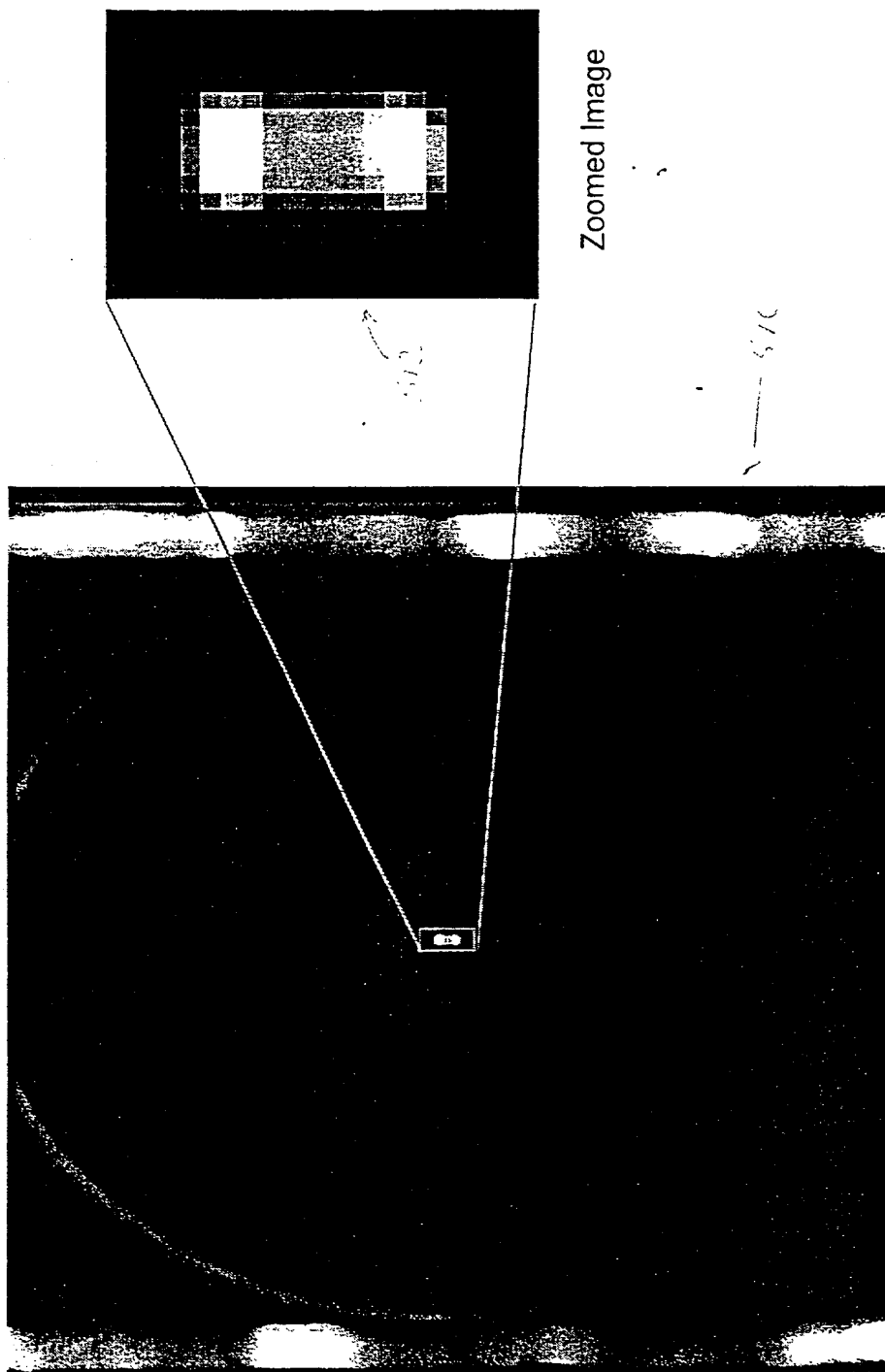
Fig. 3



Bi-Linear Interpolation

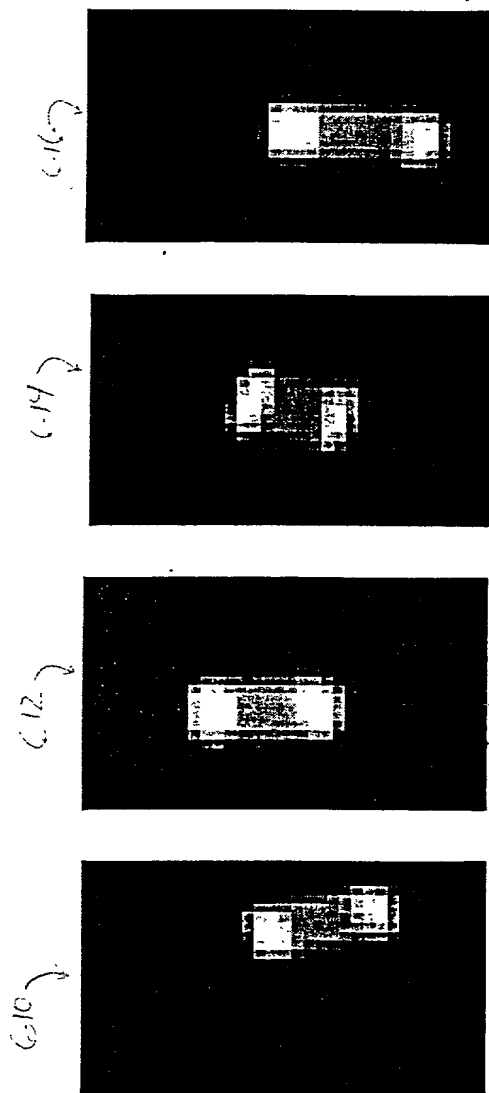
Fig. 4A

Fig. 4B



A typical image of the miniature SMC object acquired from a pick-and-place system

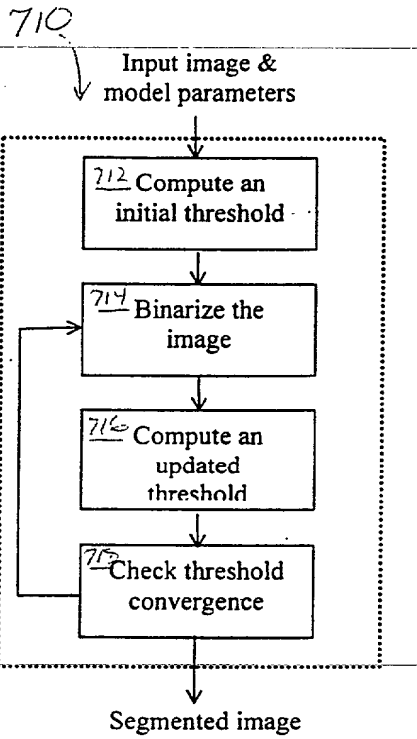
Fig. 5



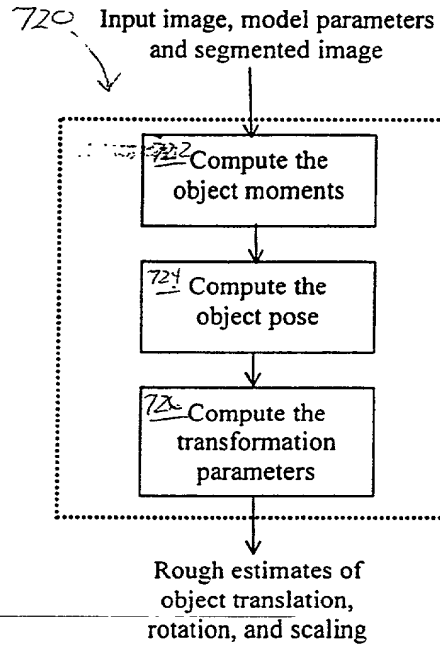
Images synthesized from our simulation process

Fig. 6

Flow Charts of Coarse Search



Object segmentation flow chart

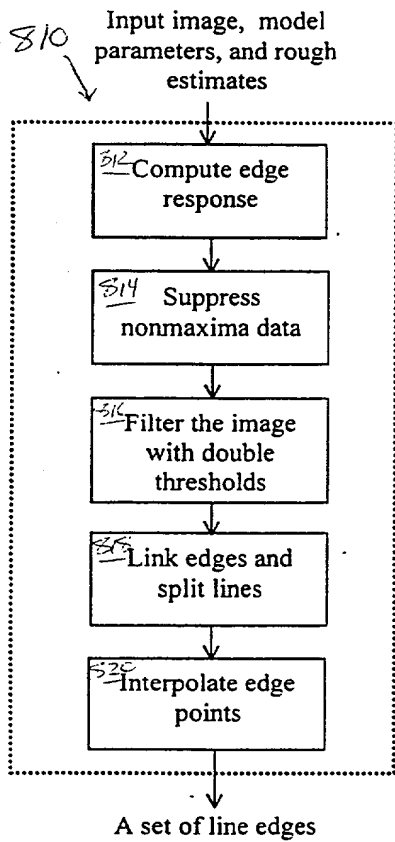


Moment transformation flow chart

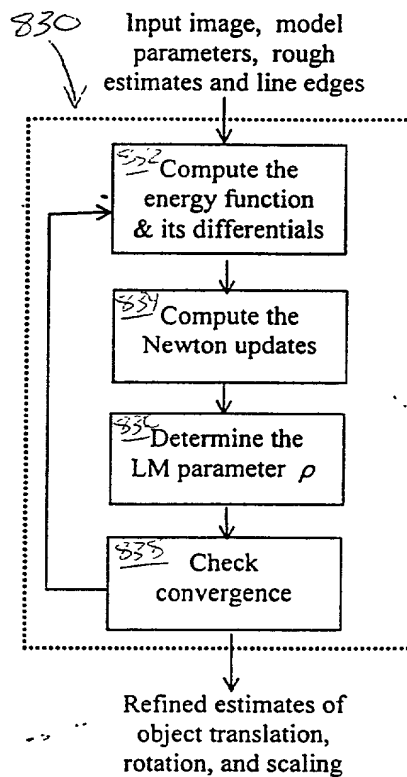
Fig. 7A

Fig. 7B

Flow Charts of Refined Search



Edge pixel detection flow chart



Pose optimization flow chart

Fig. 8A

Fig. 8B